

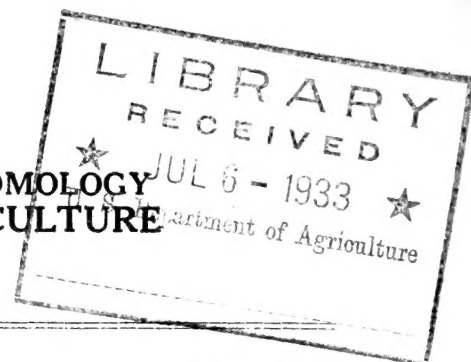
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85

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Activities for April  
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JAPANESE BEETLE AND ASIATIC BEETLE RESEARCH

The Japanese beetle situation for April.--As summarized for the monthly report, the larvae moved up early in April from their hibernating quarters to their usual feeding position just beneath the surface. Field records indicate that winter mortality for the most part had been slight and that larval development remained about the same as in late autumn and winter. Surveys indicate a considerable decrease in the numbers of larvae in the older infestations as compared with the number present a year ago and that the older infestations in New Jersey have now reached a fairly stable condition as to numbers, whereas in Pennsylvania a rapid decrease is still indicated. The reason for such decrease and alternate stabilization of population is not indicated. It is pointed out that as the season advances, with the warmer soil temperatures, disease prevalence increases.

The oriental beetle more than a lawn pest.--H. C. Hallock, Westbury, N. Y., presents an interesting record of serious injury to raspberry by the grubs of the oriental beetle, Anomala orientalis Waterh., a pest hitherto regarded as particularly a lawn pest. He says: "As a result of the feeding last fall it was observed that red raspberry plants were dying in the area where oriental beetle grubs had been abundant. In April diggings were made around bushes which were nearly dead and it was found that nearly all the small feeding roots were gone and in some cases the large root had been girdled. Fifty-one grubs were found in the soil around the roots of one bush. Approximately 20 percent of the plants in a bed 20 feet by 250 feet had been killed by the feeding of the grubs."

TRUCK CROP AND GARDEN INSECTS

Cyclamen mite and broad mite controlled by hot water treatment.--F. F. Smith, of the greenhouse-insects laboratory, Washington, D. C., reports that "Further tests on the time required to kill the cyclamen mite (Tarsonemus pallidus Bks.) below the soil surface in the crowns of Delphinium plants \* \* \* show that immersion for 25 minutes in water at 110° F. is effective. However, if the plants of the same size are freed of soil, the regular 15-minute treatment kills the mites. Tests indicate that potted Delphinium and strawberry plants are tolerant of the 25-minute treatment." (See also Monthly Letter Nos. 222, 223, and 227.)

Daffodil bulbs treated with vapor heat respond to forcing.--R. Latta, Sumner, Wash., summarizes results of forcing tests of narcissus bulbs that have been treated with vapor heat as follows: "(1) Bulbs treated with vapor heat for the following durations and temperatures when forced made satisfactory production of flowers: 2 hours at 111° F.; 3 hours at 111°; 4 hours at 108°; 6 hours at 108°; 8 hours at 106°; (2) treatments for 3 hours at 111° and for 6 hours at 108° showed slightly more effect than for 2 hours at 111°, 8 hours at 106°, or 4 hours at 108°; (3) Emperor, Victoria, and Beppy will tolerate later treatments than Golden Spur, King Alfred, and Bernardino. The data on this report do not indicate the exact time limits for successful treatment; (4) for satisfactory forcing the bulbs should be adequately cured before treatment."

Liothrips vaneeckei Priessner controlled by HCN fumigation.--R. Scopp, Sumner, reports that "Tests using sodium cyanide at the dosages of one third ounce and two thirds ounce per 100 cubic feet for 2 hours gave 100 percent mortality of larvae, pupae, and adult thrips. Two thirds ounce per 100 cubic feet for 1 hour also resulted in 100 percent mortality of the same forms. Eggs were not available for these tests."

Derris effective against cabbage worms.--C. B. Wisecup, Sanford, Fla., reports: "In laboratory tests in the month (April), the 50-50 pyrethrum-flour mixture continued to give very good kills of celery leaf-tier larvae (Phlyctaenia rubigalis Guen.). Derris powder was not effective as a contact dust for the celery leaf-tier or the celery looper (Auto-grapha falcifera Kby.), but was very effective for the imported cabbage worm (Ascia rapae L.). As a stomach poison derris dust was more effective than lead arsenate for the cabbage worms, but arsenic was more effective as far as the southern armyworm (Prodenia eridania Cram.) was concerned. In all cases, however, the larvae did not feed sufficiently to injure the treated leaf surfaces. Derris spray, mixed with an equal quantity of acetone and diluted to 1 part in 250 parts of water, was fairly effective as a contact insecticide for the cabbage worms. For the cabbage worms, these tests indicate that derris is superior to lead arsenate, both as a spray in the concentration used, and as a dust. The dust, guaranteed to contain 3 percent rotenone, was most effective. The rotenone content of the extract has not been determined."

Tobacco plants uninjured by flea-beetle insecticides.--F. S. Chamberlin, Quincy, Fla., reports that experiments to determine the toxicity of "diluted barium fluosilicate, synthetic cryolite, natural cryolite, and ground derris root" in tobacco seed beds "have been continued. All of these materials were apparently very nearly harmless to the tobacco plants. Natural cryolite appeared to be slightly more toxic than either barium fluosilicate or synthetic cryolite. Tobacco dust proved to be the most satisfactory of the various carriers tested, while talc was found to be unsuited for this work."

Malva traps attract wireworms for oviposition.---"To determine whether females trapped under piles of Malva (mallow) oviposited, fertile females were placed underneath such piles in shallow trays filled with fine mesh soil," reports M. W. Stone, Alhambra, Calif. "In one of these traps 1,066 eggs of Pheletes californicus Mann. were recovered on April 7. In another where 9 pairs had remained during the period March 20 to April 15, 618 eggs were recovered. A reduction in wireworm population appears possible by the use of Malva in localizing oviposition and later fumigating the area beneath the traps."

### FOREST INSECTS

Pine tip moth from Southwest thrives in Nebraska.---L. G. Baumhofer, Halsey, Nebr., reports on Rhyacionia neomexicana Dyar, which was introduced by accident from the Southwest into the pine plantations of Nebraska National Forest, is increasing annually, and threatens to become a serious pest. He states: "In the first field observations on April 9 several adults\* \* \* were taken in flight, indicating that this single-generation species begins emergence as early as the two-generation R. frustrana bushnelli Busck (a better known and more widely distributed species). Cool weather retarded emergence of R. neomexicana for a time but on April 23, following 2 days of warm rain, a fairly heavy emergence of this tip moth occurred. The cocoons of R. neomexicana, spun last July, have been found concentrated at the base of the infested pine trees in the bark crevices or attached to the bark at or just below the soil surface, beneath the litter."

Parasites recovered from pine moths.---P. B. Dowden, Melrose Highlands. Mass., states that J. V. Schaffner, Jr.'s "collection in America of the European pine shoot moth (Rhyacionia buoliana Schiff.) material last summer produced the following parasites: Orgilus obscurator (Nees), Eurytoma tylodermatis Ashm., Hyssopus thymus (Gir.), Calliephialtes comstocki (Cress.), Epiurus indagator (Cress.), Ephialtes conquisitor (Say), Scambus pterolas Say, Microbracon sp., and Goniozus sp. Orgilus obscurator is a species indigenous to Europe, evidently introduced with the host. Practically all of the species have been reared from the Nantucket pine moth (Rhyacionia frustrana Comst.) also." Mr. Dowden submits the following regarding European parasites of the pine shoot moth: "In 1932 a very high percentage of hymenopterous cocoons reared from R. buoliana in Austria produced the hyperparasite Perilampus tristis Mayr. Mr. Sellers was therefore requested to make a collection of overwintering larvae of R. buoliana and send them to Melrose Highlands last winter \* \* \* 100 larvae were dissected in April with the following results: 42 contained planidia (mobile first-stage larvae) of Perilampus, probably P. tristis; 14 contained Cremastus interruptor Grav.; 6 contained a braconid, probably O. obscurator. None of the Cremastus interruptor or Orgilus obscurator larvae had planidia inside them, although two of the buoliana larvae parasitized by Cremastus and two parasitized by Orgilus also

had planidia present . \* \* \* Evidently Cremastus and Orgilus are the only internal parasites from Austria that overwinter in the buoliana larvae. \* \* \* The fact that no planidia were found inside Cremastus or Orgilus larvae probably means that the hyperparasite does not attack these species."

#### CEREAL AND FORAGE INSECTS

Relation of little barley to Hessian fly control.--Reporting on field tests of little barley (Hordeum pusillum) J. R. Horton, Wichita, Kans., says, "It is again indicated that while this grass is not preferred by the fly in the presence of wheat, it is still to be reckoned with as a carry-over host which may upset to some extent the cultural part of a control program."

How the pea aphid survives the summer in Antelope Valley, Calif.--"A satisfactory explanation of the manner in which Illinoia pisi Kalt. survives the summer season in the Antelope Valley district has engaged our attention for the past several spring seasons," report R. A. Blanchard and S. J. Snow, Sacramento, Calif. "On May 1 and 2 the first oviparous females ever found by us in the Antelope Valley were located. A total of five such wingless females were found in three widely separated fields. The ratio of oviparous females to other forms was judged to be one to several thousand. The other aphids were preponderantly winged females or nymphs with wing pads. On April 28 both winged and wingless viviparous forms were found on sweet clover growing wild along a small stream in the foothills about 10 miles from the edge of the Antelope Valley. It is now thought that the wild hosts in the vicinity of the Antelope Valley and the possibility of eggs remaining unhatched in the alfalfa fields in the hot summer months offer an explanation of the manner in which the aphids carry over during the summer. The sexual females did not survive the long trip to Sacramento, so no eggs were obtained, but they have been preserved for positive determination."

Early days of hibernation most critical for corn earworm.--According to F. F. Dicke, Charlottesville, Va., "the most critical period in earworm (Heliothis obsoleta Fab.) hibernation is from the time the larvae enter the soil until the pupae have become hardened. Once the pupae have hardened it is apparent that they can withstand an excess of soil moisture over a long period of time as well as below-freezing soil temperatures. By far the greatest mortality in hibernating individuals occurs before the advent of winter. The cornfield offers excellent conditions for successful earworm hibernation, especially in the Southern States, as the dry season normally occurs early in the fall. This dry period, which favors the early pupal development, comes at the optimum time for the beginning of hibernation and also causes aestivation at the higher temperatures. A dry period coupled simultaneously with the heavy drain on soil moisture by corn at the time of maximum attack (the silking and milk stages) by the earworm no doubt provides the optimum hibernation environment for the species."



Imported parasites of corn borer show promise in Massachusetts.--W. G. Bradley and assistants, Arlington, Mass., have completed the special study of one specific field in Lexington, Mass., and submit the more pertinent facts in regard to the parasitization of European corn borers in this field:

"Total number of borers in the field...	8,765	
Number of adults produced.....	5,469, or	62.4 percent
<u>Masicera senilis</u> Rond. present.....	216, or	2.46 percent
<u>Inareolata punctoria</u> Roman present.....	1,046, or	11.93 percent
<u>Zenillia mitis</u> Meig. present.....	101, or	1.15 percent
<u>Zenillia roseanae</u> B. B. present.....	1, or	0.011 percent
<u>Nemorilla floralis</u> Fall. present.....	8, or	.091 percent
Undertermined parasites present.....	4, or	.046 percent
Total parasites .....	1,376, or	15.7 percent
Number of dead larvae.....	1,920, or	21.9 percent"

Birds reduce numbers of corn borers in Indiana.--L. G. Jones, of the European corn borer laboratory, Monroe, Mich., reports that "20 fields selected at random, covering an area of 38 square miles about the York township, Steuben County, Ind., liberation point, were sampled to ascertain the percentage of borers destroyed by birds. The borer population was 6 per 100 stalks in this area. A sample consisted of 100 infested plants from each field (25 infested plants taken from each of the four quarters). \* \* \* Eighteen of the 20 fields sampled showed 'bird-pecked' stalks ranging from 6 percent to 62 percent per 100 infested plants. Two fields showed no signs of bird-pecked plants, while 5 fields showed reductions above 50 percent. The average borer reduction for the 20 fields was 30 percent in all stalks under observation."

Fluoroscope fails to reveal corn borers in green plants.--According to L. H. Patch, Sandusky, Ohio, "One of the routine jobs requiring temporary assistance and punctual attention is the dissection of corn plants in August to determine the borer populations before the borers migrate. G. W. Still's attention was drawn to the published results of counting the number of cotton seeds infested by the pink bollworm by means of the fluoroscope. Recently a demonstrator \* \* \* came to the laboratory with a new type of portable X-ray equipment to test the possibilities of counting corn borers within stalks of corn. It was found that the number of borers within dry stalks of corn could be counted quickly and accurately by means of the X-ray and fluoroscope, but when green stalks were substituted for the dry stalks the visibility of the borers was greatly reduced. More detailed tests of the adaptability of the equipment will be made during the coming season."

#### COTTON INSECTS

Winter survival of field cricket.--Reporting on the overwintering of Gryllus assimilis pennsylvanicus Fab., one of the minor pests of cotton which sporadically causes considerable damage by feeding on young seedlings, J. W. Folsom, P. A. Woke, and L. H. Stubblefield, Tal-

lulah, La., state: "The winter of 1932-33 was unusually severe. Nevertheless a remarkably large proportion of the nymphs survived. The proportion of survivors among those that were more than half grown in the fall was much greater than among those less than half grown at that time." Of 400 nymphs that were more than half grown in the fall, 145, or 36.25 percent, had survived when counted on April 7. Among these were 7 adults---4 males and 3 females. Of 400 nymphs that were less than half grown in the fall, 58, or 14.5 percent, survived, including 1 adult male and 2 adult females. The total survival for the 800 nymphs of all sizes was 203, or 25.3 percent.

Cotton flea hopper investigations.---The workers at the new laboratory established this spring at Port Lavaca, Tex., for investigations of the cotton flea hopper (Psallus seriatus Reut.) are devoting considerable attention to the study of wild host plants. This mirid passes the winter in the egg stage in the stems of cotton and a number of weeds, the most important of which is Croton spp. Upon hatching in the spring they feed and breed on numerous species of weeds and migrate in enormous numbers to the cotton field later in the season. Horsemint (Monarda sp.) is probably the most important spring food plant in that section. The unusual abundance of wild host plants for fall oviposition and spring feeding forms a combination of favorable conditions which cause the flea hopper to be the most important cotton pest in sections of eastern Texas. K. P. Ewing and R. L. McGarr report that during April a total of 37,221 nymphs emerged from 32 hibernation cages in each of which were placed 100 plants last fall, as compared to 38,578 for March and 218 for February. From February 14 (date when hatching started) to April 30, 76,017 nymphs emerged from plants under observation, 61.2 percent of which were within a 6-day period--from March 29 to April 3. The maximum number to date for a single day was on April 1, with 13,204 nymphs, and the minimum was on April 29, when only 2 nymphs were found. During the latter part of April an average of 1,153 adults and 8 nymphs (per 100 sweeps) were swept from horsemint, 167 adults and 88 nymphs from croton, and 7 adults and no nymphs from cotton. In April oviposition was taking place on the following four plants listed in order of importance: Horsemint, croton, butterweed, and primrose. Sticky flight screens have been set up and systematic sweepings of cotton plants are being made to determine migration from wild hosts to cotton.

#### INSECTS AFFECTING MAN AND ANIMALS

Sand fly larvae (Culicoides) are scavengers.---W. E. Dove, Savannah, Ga., reports: "Our experiments show that sand fly larvae of salt marshes are scavengers. \* \* \* Culicoides larvae developing in rot holes of trees are scavengers. The salt marsh larvae feed on decaying fish and worms killed by the salt of the tidal waters. Much of the fish carrion is afforded by the trapping of minnows and the drying out of water in depressions and pockets of the marshes. As these places become dry the minnows die, decay slowly, and become food for sand fly larvae. In rot holes of trees. Culicoides larvae are favored with nature's insect



trap. Moths, cockroaches, and beetles are caught and decay in the water of these places. Eristalis larvae find the rot holes favorable for their development and associated with them one finds Culicoides larvae. The decayed insects in rot holes furnish food for the larvae of Culicoides guttipennis Coq., C. biguttatus Coq., and other species of this group."

A disease of sand fly larvae.--Mr. Dove also reports that "In microtome sections of diseased sand fly larvae taken in nature we are finding a protozoan belonging to the Gregarina group. Stages of the organism occur consistently in all material studied in sections. It appears that the larvae are able to carry this parasitic burden without a high percentage of mortality. Some of the microtome sections show development of this organism in locations which could undoubtedly cause death of the larvae. Some were found associated with ruptures of the gut wall, some were found in places which involved the nervous system, and still others appeared to incapacitate larvae through mechanical pressure of abnormal cysts. We believe that when larvae develop many cysts this can be detected in the characteristic swimming movement. From the standpoint of natural control of breeding of sand flies this discovery may not be important. The interesting and important part to us is the fact that some of the cysts can pass through the larval to the adult sand flies. Such an organism in a midge which bites man causes us to question the behavior and fate of these organisms in human tissues. Has this protozoan anything to do with some of the skin affections which occur so commonly in the coastal areas?"

Experimental traps catch more screwworm flies in Menard County, Tex., than ever before.--S. M. Perry and D. C. Thurman report that "The flies caught in 664 traps in the experimental area in Menard County from March 1 to April 1, inclusive, amounted to 1,644.8 quarts, and from April 2 to April 28, inclusive, 10,548.7 quarts. The catch of 10,548.7 quarts during the 27 days in April is by far the greatest volume of flies taken during any similar period since this number of traps has been operated. This increase in volume of flies caught in April \* \* \* apparently is not owing to a greater local abundance of flies this season, but to the change in location of approximately 50 percent of the traps formerly located in unfavorable places."

Soy beans in water attractive to Culex mosquitoes.--W. V. King, Orlando, Fla., reports: "The collections of Culex eggs at Orlando (made for the purpose of determining the relative attractiveness of various breeding media) gave the following totals for the month (April):

Breeding media

Soy sauce.....	410	egg	boats,	or	13.1	percent
Manure in water.....	704	"	"	"	22.6	"
Hay in water.....	485	"	"	"	15.5	"
Soy beans in water.....	1,395	"	"	"	44.7	"
Check - water alone.....	127	"	"	"	4.1	"
Total egg boats .....	3,121					

Toxicity of rotenone to various ticks.--H. O. Schroeder, Brownsville, Tex., reports that "Further tests on the brown dog tick (Rhipicephalus sanguineus Latr.) and other species substantiate previous results which indicate that resins present in derris root either make rotenone more toxic or, more probably, have in themselves a certain degree of toxicity. One percent precipitated rotenone diluted with tripoli earth when applied to dogs infested with R. sanguineus and with the Cayenne tick (Amblyomma cajennense (Fab.)) did not produce a satisfactory kill of the ticks. Females of the latter species partially or well engorged survived the treatment. One percent rotenone in derris extract diluted with tripoli earth was decidedly more effective. Additional tests also indicate that a higher percentage of rotenone is required to kill all stages of the Pacific Coast tick (Dermacentor nitens Neum.) than is necessary for some other species. This is particularly true of the advanced nymphal and larval stages just preceding the molt, and is no doubt owing to the quiescent state and the extra protection of the skin about to be cast off. This difficulty is not encountered in species attacking dogs, as these species do not molt on the host."

#### STORED PRODUCT INSECTS

Confused flour beetle may live more than three years.--Reporting on adults of Tribolium confusum Duv., Newell E. Good, Silver Spring, Md., states that on May 1 one male had attained the age of 3 years, 90 days, and one female the age of 3 years, 79 days.

Damage by tobacco moth in warehouse.--"On April 3 observations were made in a tobacco warehouse in Richmond, Va., infested by Ephesia elutella Hbn.," reports W. D. Reed. He says: "Five of the most heavily infested hogsheads, chosen from 30 that were opened, were examined and it was estimated that the larvae had damaged these tobaccos 15 to 20 percent of the value, or \$30 to \$40 per hogshead. \* \* \* this infestation was not widespread; however, these observations show that this insect can inflict serious damage to hogsheads of flue-cured tobacco."

Survival of raisin moth larvae in soil of fig orchards.--In a cultivated planting of the Mission variety of figs H. C. Donohoe, Fresno, Calif., found an average infestation by Epehstia figulilella Greg. of 33.4 larvae per fig tree within 8 inches of the trunk, based on an examination of the top 3 inches of soil. He states, "Soil below 3 inches and at greater distances from the trunk of fig trees has thus far yielded comparatively few larvae. Although search had been made and larvae found in the soil in various locations in previous years, the findings made on April 6 to 13 were the first to demonstrate a considerable infestation in the soil of a fig orchard. This information gives us knowledge of a new environment in which the insect is known to pass the winter in considerable numbers."

A new type of soil sifter used.--"After trying, with partial success, to separate larvae of the raisin moth from soil by washing the

finer soil particles through a sieve, H. C. Donohoe devised a type of sifter for handling dry soil," the report continues. "As the operator pulverizes the soil by hand on to the sieve he keeps the sieve in motion with a foot treadle. An advantage of the sifter lies in its suitability for use in orchards where water is not available for washing. Its use avoids carrying soil samples to the laboratory and there is advantage, also, in the more detailed information obtained when insects are separated at the site, immediately after soil samples are taken."

Notes on pea weevils.--Tom Brindley, Moscow, Idaho, reports that "On examination (in April) of the cracks and bark in the posts about four badly infested fields, 555 weevils (Bruchus pisorum L.) were collected and only 11, or 1.9 percent, were alive. Seventy-eight weevils were found in the bark of ponderosa pines near these same fields in 3 hours of digging and 14, or 17.9 percent, of the weevils were alive. Practically all of the weevils that hibernated under the bark of this tree during the preceding winter survived. No weevils have been found as yet this season beneath the debris about the edge of the pea fields. \* \* \* none of the weevils (in 71 small hibernation cages sent to different localities in Idaho) survived when the temperature dropped to -6° F. \* \* \* Six percent of the weevils in the peas in the pods and 17 percent in shelled peas in the bags from the 1931 crop were still alive."

#### FRUIT AND SHADE TREE INSECTS

Poison-molasses sprays for Mediterranean fruit fly.--O. C. McBride, Honolulu, Hawaii, reports on fruit fly baits as follows: "Adults show a slight preference for the aged moist-molasses spray over the freshly made material. Also, the efficiency of the two sprays is in favor of the aged moist spray. The copper sulphate-molasses (2 to 50) spray is more toxic to the fruit flies than the copper carbonate (2 to 50) spray. Attractants added to the molasses spray increase feeding and decrease the time for complete kill. Geraniol-ammonia, 0.1 percent concentration, and citronella, 0.1 percent, decrease the time for complete kill approximately 25 percent. No measurable value was obtained with water extract of papaya pulp, papaya juice, orange juice, or tangerine juice. Alcohol extract, however, decreased the time for complete kill by 8 to 15 percent. Amyl acetate apparently has no value in increasing the rate of kill, but the results with ethyl butyrate are more promising. Cage toxicity studies with nicotine sulphate gave more effective results than were obtainable under open, or field, conditions."

Orchard control of spittle bug.--Howard Baker, Shreveport, La., reports that a moderately heavy infestation of Clastoptera obtusa Say in an orchard at Lafayette, La., was taken advantage of to test control measures. On two dates series were run against the nymphs with nicotine sulphate in various combinations with calcium arsenate, Bordeaux mixture, and potash fish oil soap. The results indicated that

nicotine sulphate can be used to control this species with dilutions as weak as 1-1,600 combined with either potash fish oil soap, 2-50, or Bordeaux mixture, 3-4-50. In conclusion he states that "the nicotine Bordeaux combination appears somewhat superior to the nicotine soap one, especially against older nymphs." The percentage of kill with dilutions of 1-1,600 ranged from 91 to over 98 percent for younger nymphs in the applications of April 12, and from 83 to 88 percent for the older nymphs, April 27.

Russeted oranges inferior in quality to bright fruit.--"It has been the common belief," states W. W. Yothers, Orlando, Fla., "that russeted fruit is sweeter and better than bright fruit." An experiment conducted in March by Mr. Yothers, with the assistance of Ralph L. Miller and Mrs. Ione Pope Bassett, was reported as follows: "Two samples of 45 fruits each were chosen, one being all bright, sprayed (with lime-sulphur solution) fruit, and the other as nearly totally russeted by citrus rust mites (Phyllocoptes oleivorus Ashm.) as possible. Each fruit was measured, weighed, and a sample lot of similar fruit was taken for analyses of acid and solids at the same time. At intervals of 5 days the fruit was weighed and analyses were made of acid and soluble solids. \* \* \* This experiment has shown that russeted fruit is small, contains more acid, about the same quantity of soluble solids, and has a ratio of from 1 to 2 points lower than bright fruit. It loses weight almost twice as fast as does the bright fruit up to 30 days." In April the experiment was repeated: "Three samples of 50 fruits each were chosen, one of bright oranges, one of commercial russets, and the other of black russets. Each fruit was measured and weighed and an analysis was made at the beginning of a comparable sample. At 5-day intervals the fruits were weighed individually and at 10-day intervals 5 fruits for each group were analyzed for acid and soluble solids. \* \* \* As in the previous experiment, the russeted fruit lost weight twice as fast as the bright and was of much inferior quality. It had more acid and less solids than the bright fruit."

Improvements in methods and equipment for treating codling moth bands.--E. H. Siegler and Francis Munger, of the Takoma Park, Md., laboratory, have been giving further attention to improvement in the methods recommended for treating codling moth bands. Means of maintaining the beta-naphthol-oil mixture at a constant high temperature for the dipping purposes have been worked out. This is accomplished by the use of a bath of calcium chloride solution surrounding the chemical solution, rendering unnecessary the close regulation of the fire. At the instance of M. P. Jones, of the extension service of the Bureau, a new type of device for dipping the bands has been worked out. The device is inexpensive and readily made and appears to be entirely satisfactory. Those interested may obtain details from Mr. Siegler.